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MCDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

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| EXAMINER |
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VAN, LUAN V

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| ART UNIT | PAPER NUMBER |
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1753

DATE MAILED: 03/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/776,264

Applicant(s)

NITTA ET AL.

Examiner

Luan V. Van

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Applicant's amendment of February 28, 2006 does not render the application allowable.

Status of Objections and Rejections

The rejection of claims 3 is obviated by Applicant's cancellation.

The rejection of claims 1, 5 and 8 under 35 U.S.C. 102(b) as being anticipated by Neipert et al. is withdrawn in view of Applicant's amendment.

All other rejections from the previous office action are maintained.

New ground(s) of rejection (claim 6) under 35 U.S.C. 103(a) are necessitated by the amendments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 4-5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neipert et al. in view of Tokumoto.

Regarding claims 1 and 8, Neipert et al. teach a molten salt bath containing lithium bromide, cesium bromide, and a halide of an alkali metal and/or a halide of an alkaline earth metal (column 2 line 44). The illustrative phase diagram in figure 2 of a lithium bromide and potassium bromide mixture indicates that the operating temperature of the bath can be determined by the appropriate selection of the mole fraction of the components. In addition, Neipert et al. teach a molten salt bath containing lithium in excess of the stoichiometric quantity required for the reaction (column 2 lines 6-10). With respect to the limitation of using the bath for electroforming, the limitation is an intended use of the instant invention and, thus, is not given patentability weight.

Neipert et al. is silent to the specific mole fraction sum of lithium bromide and cesium bromide to the entire bath and the specific mole ratio of lithium bromide to cesium bromide. However, Neipert et al. teach a suitable bath contains lithium bromide between 43-70% by weight, and potassium bromide between 30-57% by weight (column 6 lines 45-48). The molten bath would have at least 73% of lithium bromide and potassium bromide by weight, and thus would have a combined mole fraction of at least 0.5. In addition, Neipert et al. teach that cesium bromide can be suitably be used instead of potassium bromide (column 6 lines 39-42). It would have been obvious to

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one having ordinary skill in the art to expect a molten bath comprising of lithium bromide and cesium bromide having the same or similar concentration to be suitable for precipitating titanium metal at low temperature. Furthermore, since the operating or molten temperature of the eutectic mixture is a function of the weight percent (i.e., mole fraction) of the mixture components, it would have been obvious to one having ordinary skill in the art to optimize the mole fraction of lithium bromide and cesium bromide through routine experimentation in order to employ the molten bath at a low temperature, which would be economically desirable.

Nevertheless, Tokumoto teach a method and a molten salt bath for electrodepositing titanium metal. In addition, Tokumoto teach that changing the proportion of a molten mixture would produce a metal having varying surface qualities (column 3 line 53 -- column 4 line 72; and examples 1-4). Although Tokumoto teach a molten mixture comprising of lithium bromide and potassium bromide with a combined molar ratio of 76.5 (example 1) to deposit a metal with smooth surfaces, a skilled artisan would have expected a molten mixture comprising of lithium bromide and cesium bromide having a similar molar ratio to have similar properties.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Neipert et al. by using the mole fraction within the range of the instant claim as taught by Tokumoto, because it would deposit a metal with smooth surfaces. Similarly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected the

mole ratio within the range of the instant claim through routine experimentation in order to deposit a metal with smooth surfaces.

Regarding claim 2, Neipert et al. teach a molten salt bath containing lithium bromide, cesium bromide, and a sodium iodide, which is a halide of an alkali metal (column 2 line 44). The difference between the reference to Neipert et al. and the instant claims is that the reference does not explicitly teach that the halide of the alkali metal is potassium bromide.

However, Neipert et al. teach a suitable molten salt bath comprises a mixture of potassium bromide and lithium bromide for depositing titanium (column 1 lines 45-50).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Neipert et al. by substituting the sodium iodide with potassium bromide as suggested by Neipert et al., because a skilled artisan would be able to select from among known alkali metal halides for precipitating a metal in a molten salt bath.

Regarding claim 5, Neipert et al. teach a molten salt bath wherein the said molten salt bath for electroforming has a eutectic composition (column 2 lines 35-51).

Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Westfall in view of Tokumoto and Uriu et al.

Regarding claim 6, Westfall teach an electrolytic method of depositing metal, including palladium, chromium and titanium, using molten salts and eutectic mixtures (claim 1). In addition, Westfall teach that the method can be applied to depositing a

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conformal coating on custom-shape substrates, including custom-shaped mandrels (column 37).

Westfall differs from the instant claim in that Westfall does not explicitly teach using the bath composition of the instant claim nor a resist to selectively mask the substrate.

Neipert et al. teach a molten salt bath containing lithium bromide, cesium bromide, and a halide of an alkali metal and/or a halide of an alkaline earth metal (column 2 line 44).

Uriu et al. teach a method of manufacturing a metal product, comprising the steps of: forming a resist pattern on a conductive substrate and exposing a portion of said conductive substrate (example 1); immersing said conductive substrate having said resist pattern formed into an electrolytic bath for electroforming; and precipitating a metal at a portion where said conductive substrate is exposed.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Westfall by using molten bath of Neipert et al., because the eutectic mixtures the alkali and alkaline earth metal halides are suitable for depositing a metal at lower melting temperatures (column 2 lines 12-16).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the method of Westfall by electrodepositing a metal on the substrate having a resist pattern as taught by Uriu et al., because using a resist pattern would allow selective deposition of a metal on the exposed area of a conductive substrate.

Regarding claim 7, Westfall teach that chloride, bromide and iodide salt mixtures are excellent candidates as low temperature molten salt baths (column 31 lines 6-15), and that numerous molten salt baths, having operating temperatures equal to or less than 300°C, can be used (column 30-31; mixtures 103 and up).

Response to Arguments

Applicant's arguments have been fully considered but they are not persuasive.

In the arguments presented on page 5 of the amendment, the Applicant suggests that the Neipert et al. do not disclose every limitation of the amended claims. The examiner agrees, and thus the rejections under 35 U.S.C. 102(b) have been withdrawn. New rejections under 35 U.S.C. 103(a) are therefore appropriate.

As described above, Neipert et al. teach a molten salt bath containing lithium bromide, cesium bromide, and a halide of an alkali metal and/or a halide of an alkaline earth metal (column 2 line 44). The illustrative phase diagram in figure 2 of a lithium bromide and potassium bromide mixture indicates that the operating temperature of the bath can be determined by the appropriate selection of the mole fraction of the components. In addition, Neipert et al. teach a molten salt bath containing lithium in excess of the stoichiometric quantity required for the reaction (column 2 lines 6-10). Furthermore, Neipert et al. teach a suitable bath contains lithium bromide between 43-70% by weight, and potassium bromide between 30-57% by weight (column 6 lines 45-48). The molten bath would have at least 73% of lithium bromide and potassium bromide by weight, and thus would have a combined mole fraction of at least 0.5. In

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addition, Neipert et al. teach that cesium bromide can be suitably be used instead of potassium bromide (column 6 lines 39-42). It would have been obvious to one having ordinary skill in the art to expect a molten bath comprising of lithium bromide and cesium bromide having the same or similar concentration to be suitable for precipitating titanium metal at low temperature. Since the operating or molten temperature of the eutectic mixture is a function of the weight percent (i.e., mole fraction) of the mixture components, it would have been obvious to one having ordinary skill in the art to optimize the mole fraction of lithium bromide and cesium bromide through routine experimentation in order to employ the molten bath at a low temperature, which would be economically desirable.

Furthermore, changes in temperature or concentration will not support the patentability of subject matter unless there is evidence indicating such temperature or concentration is critical. It is not inventive to discover the optimal or workable ranges by routine experimentation (MPEP 2144.05).

In response to applicant's argument that there is no suggestion to combine Westfall and Uriu et al., the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As the Court of Appeals for the Federal Circuit has stated, there are three possible sources for

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motivation to combine references in a manner that would render claims obvious. These are: (1) the nature of the problem to be solved; (2) the teaching of the prior art; and (3) the knowledge of persons of ordinary skill in the art. In re Rouffet, 47 U.S.P.Q.2d 1,453, 1458 (Fed. Cir. 1998). In this case, both references are directed to electroplating a metal on a conductive substrate. In addition, Westfall suggests using optical lithographic techniques (column 37 lines 41-46) for preparing the surface. Using resist for selective electroplating is conventionally known in the art. Nevertheless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Westfall by electrodepositing a metal on the substrate having a resist pattern as taught by Uriu et al., because using a resist pattern would allow selective deposition of a metal on the exposed area of a conductive substrate.

The examiner believes that he has met the requirement for a prima facie case of obviousness.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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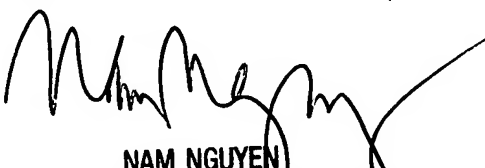
TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan V. Van whose telephone number is 571-272-8521. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LVV
3/28/2006


NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700